MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2018/2019

DCS5038 – PROGRAM DESIGN

(DIT & DBIS Groups)

29 MAY 2019
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS:

1. This question paper consists of 8 pages.
2. **SECTION A**: Answer **ALL** questions.
3. **SECTION B**: Answer **ONLY ONE (1)** question.
4. Please print all your answers in the Answer Booklet provided.

SECTION A (30 Marks)

Instruction: Answer ALL questions from this section and write your answers in the answer booklet provided.

QUESTION 1 (10 Marks)

a. Based on the description given below, draw the **flowchart** to calculate the area of a selected shape. [2.5 marks]

- Initialize all the required variables.
- Get the input *shape, width* and *height* from the user.
- Based on the table given, calculate the area of the selected shape.

Shape	Area Formula
A	$width\ x\ height$
B	$\frac{1}{2} x\ width\ x\ height$
Others	$area = 0$

- Display the shape's *area*.
- Repeat the process by asking the user to continue or to terminate the program. Use *do while* loop.
- If user do not wish to continue, display "Thank you!".

SAMPLE OUTPUT

```
A. Rectangle
B. Triangle
====================
Select Shape     : A
Enter width      : 2.4
Enter height     : 2.1
Area             : 5.04

Calculate area again? Y

Select Shape     : B
Enter width      : 4.2
Enter height     : 5.5
Area             : 11.55

Calculate area again? N
Thank you!
```

b. Based on the description given in (a), write the **pseudocode**. [2.5 marks]

Continued...

c. Find the value of *d* for each of the expressions given below.
[Note: The expressions are not related to each other] [5 marks]

int a=6, b=3, c=5, d;

i. d = (++a * b--) % 2;
ii. d = c-- * (--a + ++b);
iii. d = b++ * ++b / 2;
iv. d = a-- * ++b * ++a;
v. d = (b++ * --c) * ++a;

QUESTION 2 (10 Marks)

a. Based on the table below, write a *switch case statement* to identify the message received based on the student's grade. [5 marks]

Grade	Message
A	Keep up the good work and well done!
B	Keep up the good work and good job!
C	Work harder and you can do better!
Others	Invalid grade.

b. Complete the program based on the instructions given below. The program is to subtract the value *n* from *m* and store in *z*. [5 marks]

```
.....(i).....
int main()
{
      int m,n,z;

      m=5,n=3;

      .....(ii).....

      .....(iii).....
}

.....(iv).....
{
      .....(v).....

}
```

i. Write a function prototype for function *minus(...)* that has three parameters, which are two integer value parameter and one integer pointer parameter.
ii. Call a function *minus(...)*. Pass the variables *m* and *n* as value parameters and pass *z* as a pointer parameter.
iii. Display value *m*, *n* and *z* as per sample output: ***5 – 2 = 3**, where 5, 2, and 3 are the values of m, n, and z respectively*
iv. Write a function header for function *minus(...)*.
v. Calculate the subtraction value of *n* from *m* and store the result back into referenced variable *z*.

Continued...

QUESTION 3 (10 Marks)

a. The program is to record total course work marks of three students. Write the C code based on the following instructions. [5 marks]

i. Declare a structure for marks record called *Marks* that has:
- Student ID : *sid (char array)*
- Quiz marks : *quiz (float)*
- Test marks : *test (float)*
- Assignment marks : *assignment (float)*
- Total course work marks : *cw (float)*

ii. Create a structure array called *student* for 3 students.
iii. Get input *Student ID* from user.
iv. Get input *Quiz marks, Test marks, and Assignment marks* from user.
v. Calculate the total course work marks and store in structure variable *Total course work marks.*
vi. Display the *Total course work marks*. Refer to sample output.

SAMPLE OUTPUT

```
Enter Student #1 ID                    : 1181109398
Enter quiz,test, & assignment marks    : 5.5 26 10.5
1181109398 Total Course Work Marks     : 42.00

Enter Student #2 ID                    : 1181121635
Enter quiz,test, & assignment marks    : 6 29.5 11
1181121635 Total Course Work Marks     : 46.50

Enter Student #3 ID                    : 1181965473
Enter quiz,test, & assignment marks    : 5 30 9.5
1181965473 Total Course Work Marks     : 44.50
```

```
#include<stdio.h>
#include<string.h>

.....(i).....

void main()
{
     .....(ii).....

     int x;
     for(x=0;x<3;x++)
     {
          fflush(stdin);
          printf("Enter Student #%d ID\t\t\t: ", (x+1));
          .....(iii).....

          printf("Enter quiz,test, & assignment marks\t: ");
          .....(iv).....
          .....(v).....
          .....(vi).....

          printf("\n\n");
     }
}
```

Continued...

b. The program is to calculate the total percentage for each race based on the gender in Malaysia for four years. Write C code based on the following instructions.

[5 marks]

```
//statistic races based on gender for 4 years in Malaysia
#include<stdio.h>
int main()
{
     float  f_bumi[4],  f_chinese[4],  f_indian[4],  f_others[4],
m_bumi[4],  m_chinese[4],  m_indian[4],  m_others[4],  total_bumi,
total_chinese, total_indian, total_others;
     int i;

     ..................(i).....................

     ..................(ii).....................

    i=0;
     ..................(iii).....................

    i=0;

     ..................(iv).....................

     ..................(v).....................

}
```

i. Create file pointer variables named *read_female, read_male* and *write.*
ii. Open the file *female.txt* and *male.txt* for reading and file *total_statistic.txt* for writing.
iii. Use a *while loop* statement to loop till the end of the file:
   - Read all the data from the file *female.txt* and store them in appropriate variables. *[Hint: Use array for the variables]*

iv. Use a *while loop* statement to loop till the end of the file:
   - Read all the data from the file *male.txt* and store them in appropriate variables. *[Hint: Use array for the variables]*

v. Use for loop:
   - Calculate total gender for each of the races.
     Example: total bumiputra = female bumiputra + male bumiputra.
   - Write the year since 2014 to 2018, *total_bumiputra*, *total_chinese, total_indian* and *total_others* in the output file.

The contents of the files are shown below.

Content of *male.txt*

```
<bumiputra> <chinese> <indian> <others>
12.3 3.5 4.2 6.1
14.5 4.1 4.3 2.6
11.1 5.5 6.1 3.4
13.5 3.2 3.4 5.4
```

Content of *total_statistic.txt after execution*

```
<year> <bumiputra> <chinese> <indian> <others>
2014 27.80 8.40 10.30 17.40
```

Continued...

```
2015 30.60 9.70 9.60 13.20
2016 24.40 11.90 13.60 10.80
2017 30.70 11.20 8.10 12.40
```

Content of *female.txt*

```
<bumiputra> <chinese> <indian> <others>
15.5 4.9 6.1 8.7
16.1 5.6 5.3 6.6
13.3 6.4 7.5 5.4
17.2 8.0 4.7 6.2
```

SECTION B (20 Marks)

Instruction: *Choose and answer **ONLY ONE (1)** question from this section and write your answers in the answer booklet provided.*

QUESTION 1 (20 Marks)

Write a full program based on the following instructions. This program will calculate the total calories intake by the user and display the balance calories.

Declare a *structure* of food record called *Food* that has:

- Food Name : *foodName (char array)*
- Food Calories : *calories (int)*
- Food Portion : *portion (int)*
- Total Calories : *totalCalories(int)*

In function *main( )* :

- Call function *displayTitle( )* to display the program title.
- Ask the user to enter *maximum calories* intake per day.
- Ask user to enter *number of food* to check.
- Call function *getFood(...)* and pass the *number of food* as parameter.
- Call function *checkCal(...)* and pass *grand calories* and *maximum calories* as parameters.

In function *displayTitle( ):*

- Display the program title. Refer the sample output.

In function *getFood(...)*:

- Declare a prototype for this function.
- Create a structure variable array *food_cal* which number of element depends on the number of food that user key in.
- Using a *for loop*:
  - prompt user to enter *foodName, calories* of the food for one portion, number of *portion* the user has taken.
  - Calculate the *totalCalories* of the food.
  - Calculate the *grand calories* of what the user has taken for the day.
- return *grand calories.*

function *checkCal(...)*:

- Declare a prototype for this function.
- Display the *grand calories* that the user has intake for the day.
- Using an *if..else* statement, determine if the user still have balance calories.

Continued...

Condition	Action
If *grand calories* are less than *maximum calories,*	• Calculate *balance calories* • Display message as per sample output 1.
If *grand calories* are greater than *maximum calories,*	• Display message as per sample output 2.

SAMPLE OUTPUT 1

```
#####################################
        CALORIES CALCULATOR
#####################################
Enter max calories intake       : 1500
Enter number of food            : 2

Food # 1
Enter name      : Nasi Lemak
Enter calories  : 600
Enter portion   : 1

Food # 2
Enter name      : Curry Puff
Enter calories  : 128
Enter portion   : 1

Total Intake    : 728
You may intake 772 calories more.
```

SAMPLE OUTPUT 2

```
#####################################
        CALORIES CALCULATOR
#####################################
Enter max calories intake       : 1500
Enter number of food            : 3

Food # 1
Enter name      : Nasi Lemak
Enter calories  : 600
Enter portion   : 1

Food # 2
Enter name      : Curry Noodles
Enter calories  : 695
Enter portion   : 1

Food # 3
Enter name      : Curry Puff
Enter calories  : 128
Enter portion   : 3

Total Intake    : 1679
You have intake more than you should!
```

Continued...

QUESTION 2 (20 Marks)

Write a complete program that determines the registration payment for Kidzania Playground.

Given is a text file named code.*txt* that contains data of *promotion code*.

Content of *code.txt*   *<promotion code>*
T110   T220   T330

Another text file named *registration.txt* is an empty file.

In function *main( )* :

- Declare all necessary variables.
- Create file variable names: *input* and *output*.
- Open the file *code.txt* for reading.
- Open the file *registration.txt* for writing.
- If the file *code.txt* doesn't exist, display "*The file is not existed!*", else use a *while loop* to read each record until the end of the file:
  - Read the *promotion code* from the file.
- Get input registration *choice* from user.
- Using *while loop* statement, loop the statement below if user choose to register.
  - Get input *name*, *quantity* of kid, and *promo code*.
  - Using *for loop* statement, compare *promo code* enter by user with *promotion code*.
    - If the promo code is same, then set *status* is "valid".
    - Call function *get_promoprice(...)* and pass *promo code* as parameter to get *promo price*.
    - Set found is 1.
  - If found is 0, then set *status* is "invalid" and *promo price* is RM 90.00.
  - Call function *calculate_price(...)* and pass *promo price* and *quantity* of kid as parameters to get *total* of price.
  - Display *name*, *quantity* of kid, *status*, *promo price*, and *total* to the command prompt.

SAMPLE OUTPUT *(Bold values are input from user)*

```
Do you want to register : Y
Enter your name :Mia Aleesya
Enter number of kid :5
Enter your promo code :T110
Name :Mia Aleesya
Number of Kids : 5
Promo Status : Valid
Promo Price : 75.00
Total Price : 375.00

Do you want to register : Y

Enter your name :Marsha Aleeya
Enter number of kid :2
```

Continued...

```
Enter your promo code :B202
Name :Marsha Aleeya
Number of Kids : 2
Promo Status : Not Valid
Promo Price : 90.00
Total Price : 180.00

Do you want to register : Y

Enter your name :Misha Anuar
Enter number of kid :1
Enter your promo code :T330
Name :Misha Anuar
Number of Kids : 1
Promo Status : Valid
Promo Price : 55.00
Total Price : 55.00

Do you want to register : N
```

- Write *name*, *quantity* of kid, *status*, *promo price*, and *total* into file *registration.txt*.

Content of *student_payment.txt* after execution

<name> < quantity >< status >< promo price >< total >

```
Mia Aleesya     5 Valid     75.00     375.00
Marsha Aleeya   2 Not Valid 90.00     180.00
Misha Anuar     1 Valid     55.00     55.00
```

- Get input registration *choice* from user.

In function *get_promoprice(...)*:

- Using *if else* statement, set *promo price* based on the following table.

Promo Code	Promo Price (RM)
T110	75.00
T220	65.00
T330	55.00

- Return the *promo price* value.

In function *calculate_price (...)*:

- Return the calculation *promo price* * *quantity*.

End of Page.